



Continental Automotive Systems Sibiu

City autonomous courier

Continental Technical Competition 2016

Rules and regulation booklet



Continental Technical Competition 2016

Design & implement a city autonomous courier

- Awards: > **1st Place - 1500 EURO**
> **2nd Place - 1000 EURO**
> **3rd Place - 500 EURO**

Subscription deadline: 15th of January 2016

Competition Date: 21st - 22nd of April 2016

If you have any questions feel free to contact us via e-mail at the following address:

technical-competition@continental-corporation.com

1. GENERAL ASPECTS

a. Target group

- The competition is addressed to all active students (including master programs) from technical faculties (Computer Science, Electrical Engineering, Electronics, Mechatronics, Robotics, Electromechanics, etc)

b. Competition team

- Consisted of maximum 3 students regardless the technical area of expertise

c. Competition description

- Design an autonomous robot / vehicle able to:
 - o carry 3 different wood shapes
 - o deliver each shape at a specific destination point according to each shape (each destination is marked by a different color)
 - o sign recognition feature (mandatory left sign, mandatory right sign, stop sign)
 - o drive on a specific track

d. Project idea presentation

- For the pre-selection the teams should prepare a presentation document within 10 pages written in English, that will include:
 - Project description / architecture
 - Costs / spending
 - Details of all technical aspects involved in the projects
 - List of materials needed to implement the project idea (including a web link with component data sheet)
 - Main steps of implementing the project idea and responsables
 - Time planning
 - Other aspects that proves the fulfillment of the contest requirements
 - Deadline for sending the presentation: 1st of February 2016
- Participation intention e-mail should be send prior to the presentation described above
- Previous already done projects with the same functionality are forbidden, including existing (already built) products on market
- The first period of pre-selection ends on 15th of February 2016
- A second pre-selection via Skype will take place between 14th – 25th of March 2016 when all the teams previously selected must provide an actual status of the project

e. Financial aspects*

- The final product will remain in the teams' property
- The transport will be supported by Continental Sibiu if you travel by train and/or bus (based on the travel tickets for each team member)

* Note to previous participating teams: Continental will not offer grants anymore.

f. Deadlines and checkpoints

- Application deadline: 15th of January 2016
- Pre-selection deadline & Results communication: 15th of February 2016
- Final selection deadline & Results communication: 25th of March 2016
- The selected teams will have to implement the project until 21st of April 2016 according to the original idea. No deviations allowed
- Competition date: 21st – 22nd of April 2016
- Regular checkpoints during implementation will be performed online. Project implementation status will be sent online via e-mail
- In the days of the contest, teams are allowed to bring with them the equipment needed for final adjustments

2. TECHNICAL REQUIREMENTS

a. Racing track and robot / vehicle

- The robot / vehicle should be able to drive independently (no external intervention during the official attempt) on a designated area, from Starting line up to Finish line
- The track has a White border which must not be trespassed by the robot / vehicle wheels (Trespassed = robot / vehicle projection is not hovering the white border)
- The robot / vehicle must be able to:
 - o Carry 3 wooden shapes in the same time



- o Detect the following signs: mandatory left



- o Detect the following signs: mandatory right
- o Detect the following signs: stop
- o Take turns based on traffic sign placed in right side of the crossroad
- o Take turns automatically based on white lines when there are no crossroads (follow the road). Drop the shapes in a designated area, marked by one of above shapes (shape 1, 2 or 3)
- The image processing (traffic sign recognition) can be made on PC (wireless camera -> PC -> robot).
- Ground clearance of the robot / vehicle must be at least 5mm. Inside the track might be randomly 2-3mm bumps (level difference due to track construction), which the robot / vehicle must trespass.
- Robot / Vehicle dimensions:
 - The robot / vehicle projection must fit into a 20cm x 30cm shape
 - The robot / vehicle height: max 20cm
- The signs will be placed in the middle of the track at a height around 21cm (+/- 2cm)
- The signs will be inserted into a 15cm x 15cm square



*all the signs presented in this document are only for information. The dimension of the signs will be provided in due time.

3. CONTEST RULES

a. Preparation time

- Each team will be granted preparation time 1 day before the contest
- In the contest day no preparation is allowed
- Modifications regarding the vehicles' behavior (HW and SW) are NOT allowed during the contest

b. Competition

- **b.1.** Only one robot / vehicle is allowed to be placed on the track at any given time
- **b.2.** Each team has the right of three official attempts
- **b.3.** The robot / vehicle must reach the FINISH point in order to be qualified for ranking
- **b.4.** The robot / vehicle must not physically separate into pieces. If the robot / vehicle will separate into pieces, it will be disqualified.
- **b.5.** The robot / vehicle must not damage any component of the track. If any component is damaged, the robot / vehicle is disqualified in the respective attempt
- **b.6.** The criteria of winning the competition is the **PENALTY POINT** as follows:
 - o **b.6.1** Each second in which the car is on the track is considered 1 point (+1 point / second)
 - o **b.6.2** For each matching wooden piece that is dropped EXACTLY in the marked area 60 points will be subtracted from the final score (-60 points / shape)
 - o **b.6.3** For each matching wooden piece that is not dropped in the corresponding area but it is placed in an area of 20cm around it 30 points will be subtracted (-30 points / shape)
 - o **b.6.4** If b.6.2 or b.6.3 are not fulfilled or wrong shape is delivered 60 points will be added (+60 points / shape)
 - o **b.6.5** For not following the sign direction 60 points will be added (+60 points / sign)
 - o **b.6.6** For following the sign direction 60 points will be subtracted (-60 points / sign)
 - o **b.6.7** If any wheel is outside the white border at any time, 100 penalty points will be added (+100 points for each trespassing). If all wheels are outside the white border, the robot / vehicle is disqualified in the respective attempt.
 - o **b.6.8** When reaching the Finish 30 points will be subtracted (-30 points / attempt)
- **b.7.** The team with the **SMALLEST** number of points will WIN the competition
- **b.8.** The best lap will be taken into account for each robot / vehicle
- **b.9.** Time limit for each attempt is 5 minutes

c. Selection criteria

- Presentation of the project idea and design
- Final selection with pictures and movie
- The evaluation will be made by the Continental technical team

d. Appeals

- The appeals can be submitted to the organizers only when all the participants finished all the rounds.



4. Contacts

- If any questions feel free to contact us via e-mail on the following address:

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*all replies will be distributed to all participant teams!!!